CRACK DETECTION IN WELDED MATERIAL BY USING PULSE ECHO ULTRASONIC METHOD

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ABSTRACT

This research were done in order to determine whether the crack can been seen or not by using pulse echo method of ultrasound. Their location, length and depth were determined to proved the existed of discontinuity in the test material. The angle probe with frequency 2 MHz and 4 MHz had used with angle of 45^0,60^0, and 70^0. This traditional ultrasonic testing were done on several stainless steel of welded sample in order to investigate either the signal can be read or not by oscilloscope. From this experiment, the signal can be interpreted although the testing was done by using pulse echo ultrasonic method. Unfortunately, the signal cannot be seen by 70^0 angle probe with 2 MHz. The crack can clearly detected by using 2 Mhz frequency of probe compared to 4 Mhz of probe. The probe with angle 45^0 and 60^0 are the best probe that can easily interpreted the signal on oscilloscope.

CHAPTER 1

INTRODUCTION

1.1 Basic of Ultrasound

Ultrasonic testing made of the basic physical property that sound waves travel at known constant velocities through any sympathetic medium. By measuring the time for a sound wave to travel through a material it can be determined how far that wave has traveled. In this way sound waves can be used to measure distances. It also can be made by the fact that sound waves are reflected at an interface between two materials. In order to develop and make the best of these principles, the basic Ultrasonic testing uses high frequency sound energy to conduct examinations and make measurements. Ultrasonic examinations can be conducted on a wide variety of material forms including castings, forgings, welds, and composites. A considerable amount of information about the part being examined can be collected, such as the presence of discontinuities, part or coating thickness and acoustical properties can often be correlated to certain properties of the material.

Ultrasonic technique have traditionally used for the nondestructive evaluation of planar defects, such as cracks, in structural material. Reliable, accurate evaluation of crack is great concern and importance for the assessment of structural integrity and for predicting the serviceability of parts containing defects. With the advent of fracture mechanics, it has become possible to take credit for the remaining life or strength if it could be establish that the crack was less than a certain size [1].